

Species Interactions

Mutualism

Mutualism is a [biological interaction](#) between two organisms, where each individual derives a [fitness](#) benefit, for example increased survivorship. Similar interactions within a species are known as [co-operation](#).

Commensalism

In [ecology](#), **commensalism** is a class of relationship between two organisms where one benefits and the other is not significantly harmed or benefited. The term derives from the [English](#) word [commensal](#), meaning "sharing of food" in human social interaction, which in turn derives from the [Latin](#) *com mensa*, meaning "sharing a table".

Ammensalism

In ecology, ammensalism occurs when one species hurts another, but does not benefit from this interaction. It is a -/0 relationship. For example, algal blooms can lead to the death of many species of fish, however the algae do not benefit from the deaths of these individuals.

Exploitation

When one organism benefits at the others expense

Antibiosis

Antibiosis is a type of [Biological interaction](#). an·ti·bi·o·sis (nt-b-ss, nt-) n. 1. An association between two or more organisms that is detrimental to at least one of them. 2. The antagonistic association between an organism and the metabolic substances produced by another.' Antibiosis: *The general relationship between an antibiotic and an infectious organism is one of antibiosis. This word refers to an association of two organisms in which one is harmed or killed by the other. The relationship between human beings and disease-causing germs is one of antibiosis. If a person is affected by germs, he is the injured organism.*

Competition

Competition is a rivalry between individuals, groups, nations, or animals, for territory, a niche, or allocation of resources. It arises whenever two or more parties strive for a goal which cannot be shared. Competition occurs [naturally](#) between living organisms which co-exist in the same [environment](#). For example, animals compete over water supplies, food, and mates, etc. Humans compete for water, food, and mates as well, though when these needs are met deep rivalries often arise over the pursuit of [wealth](#), prestige, and [fame](#). Business is often associated with competition as most companies are in competition with at least one other firm over the same group of customers.

Food Chains / Food Webs

A **food chain** shows how each living thing gets its food. Some animals eat plants and some animals eat other animals. For example, a simple food chain links the trees & shrubs, the giraffes (that eat trees & shrubs), and the lions (that eat the giraffes). Each link in this chain is food for the next link. A food chain always starts with plant life and ends with an animal.

1. Plants are called **producers** because they are able to use light energy from the Sun to produce food (sugar) from carbon dioxide and water.
2. Animals cannot make their own food so they must eat plants and/or other animals. They are called **consumers**. There are three groups of consumers.
 - a. Animals that eat ONLY PLANTS are called **herbivores** (or [primary](#) consumers).
 - b. Animals that eat OTHER ANIMALS are called **carnivores**.
 - carnivores that eat herbivores are called [secondary](#) consumers
 - carnivores that eat other carnivores are called [tertiary](#) consumerse.g., killer whales in an ocean food web ... phytoplankton → small fishes → seals → killer whales

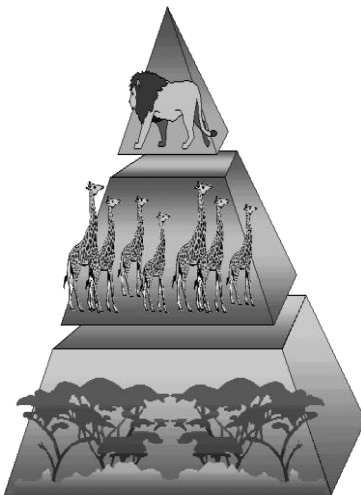
3. Animals and people who eat BOTH animals and plants are called **omnivores**.
4. Then there are **decomposers** (bacteria and fungi) which feed on decaying matter.
These decomposers speed up the decaying process that releases mineral salts back into the food chain for absorption by plants as nutrients.

Do you know why there are **more herbivores than carnivores**?

In a food chain, energy is passed from one link to another. When a herbivore eats, only a fraction of the energy (that it gets from the plant food) becomes new body mass; the rest of the energy is lost as waste or used up by the herbivore to carry out its life processes (e.g., movement, digestion, reproduction). Therefore, when the herbivore is eaten by a carnivore, it passes only a small amount of total energy (that it has received) to the carnivore. Of the energy transferred from the herbivore to the carnivore, some energy will be "wasted" or "used up" by the carnivore. The carnivore then has to eat many herbivores to get enough energy to grow.

Because of the large amount of energy that is lost at each link, the amount of energy that is transferred gets lesser and lesser ...

1. **The further along the food chain you go, the less food (and hence energy) remains available.**



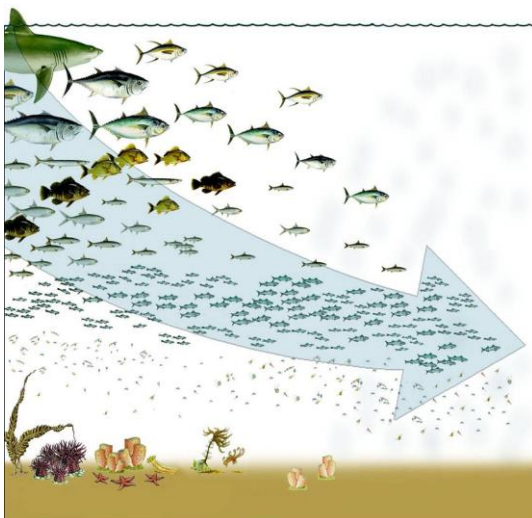
The above **energy pyramid** shows many trees & shrubs providing food and energy to giraffes. Note that as we go up, there are fewer giraffes than trees & shrubs and even fewer lions than giraffes ... as we go further along a food chain, there are fewer and fewer consumers. In other words, a large mass of living things at the base is required to support a few at the top ... many herbivores are needed to support a few carnivores

2. **Most food chains have no more than four or five links.**

There cannot be too many links in a single food chain because the animals at the end of the chain would not get enough food (and hence energy) to stay alive.

Most animals are part of more than one food chain and eat more than one kind of food in order to meet their food and energy requirements.

These **interconnected food chains** form a food web.



A change in the size of one population in a food chain will affect other populations.

This interdependence of the populations within a food chain helps to maintain the balance of plant and animal populations within a community. For example, when there are too many giraffes; there will be insufficient trees and shrubs for all of them to eat. Many giraffes will starve and die. Fewer giraffes means more time for the trees and shrubs to grow to maturity and multiply. Fewer giraffes also means less food is available for the lions to eat and some lions will starve to death. When there are fewer lions, the giraffe population will increase.